WORLD ENERGY OUTLOOK

THROUGH 2000

conoco
A Du Pont Subsidiary

1992

INTRODUCTION

During the 1980s, politics and economics led to a greater reliance on the market to manage energy trade. Deregulation and greater price transparency have resulted in markets which are more responsive to changes in supply and demand.

Nowhere is this more apparent than in oil markets. Before the 1980s, crude oil was not traded like a commodity. In the 1950s and 1960s, oil markets were dominated by large, integrated, international oil companies that controlled all parts of the supply chain and were able to maintain relatively stable prices to the consumer.

In the 1970s, most oil was sold under long-term supply contracts, and OPEC set official prices. Economic factors changed the industry in the 1980s, when OPEC's high oil price strategy of the late 1970s and early 1980s led to lower oil demand and greater non-OPEC supplies. OPEC members who adhered to official prices had to shut in fields, losing share to members who cut prices. The result was substantial excess OPEC production capacity. Saudi Arabia carried most of the burden of falling production before giving up its swing role and turning to netback pricing in mid-1985. As a result, prices fell from the high $20s to as low as $10 per barrel.

Today, dynamic spot and futures trading have replaced the official price system and informal trading systems in place since the 1970s. In this new environment, short-term prices fluctuate as the market adjusts to changes in supply and demand, and producers and consumers can hedge price uncertainty in the futures market. These changes have created a commodity market with much short-run volatility, but with a propensity to restore equilibrium much more rapidly than was possible in the former, more rigid oil market. This was clearly demonstrated during the 1990-91 Persian Gulf crisis, when prices rose rapidly following the loss of Iraqi and Kuwaiti supplies, but quickly returned to equilibrium once uncertainty over future oil supplies was reduced.

However, as this crisis reminded us, the risk of major oil price shocks remains, and such shocks can significantly impact economic growth. Middle Eastern politics have been the major source of post-World War II price shocks, and political events will continue to have the greatest potential to destabilize oil markets.

Additionally, the move towards free markets in many world economies is opening up new energy investment opportunities, not only in the former Soviet republics and Eastern Europe, but also in many countries which, for the last two decades, have closed their doors to foreign energy investment.

Concerns over environmental degradation and global climate change are rising to the forefront of political and social agendas around the world. While the market efficiently allocates resources, it does not account for all environmental costs. This does not mean we should abandon the free market. In fact, policy options, which are being developed at both the international and national level, should try to minimize market distortions and allow flexible compliance strategies in order to meet environmental goals in the most cost-effective way, and in doing so, force companies to look at environmental costs as any other cost of production.

World Energy Outlook Through 2000 summarizes a future energy supply and demand scenario that assumes low-cost fossil fuels will continue to be available, and sustained economic growth will require increasing amounts of energy consumption. Since economic growth will be geographically uneven, so will the increases in energy consumption.

The Outlook begins with an assessment of world energy supply and demand, and then focuses on the U.S. energy picture. This is followed by a discussion of the policy implications for the United States and other nations faced with the challenge of achieving both economic and environmental goals in a volatile energy market.

KEY FACTORS

The major assumptions upon which this Outlook is based are noted below.

Economic Growth

The world economy, as measured by Gross Domestic Product (GDP) is expected to grow, on average, 3% per year through the turn of the century, about the same rate of growth as in the 1980s. East Asia will continue to have the strongest economic growth, at over 4% per year. The economies of Eastern Europe and the former Soviet Union are currently in transition, and are likely to experience recessions as they make the change from centrally planned economies (CPEs) to market systems. Economic contraction is expected to be followed by strong growth later in the decade. Over the decade, the average annual economic growth for the CPEs (including both former and current Communist countries) will be 2% per year.

Environmental Regulations

Environmental degradation issues are gaining in importance in all countries of the world. This Outlook considers existing legislation as well as likely future regulation. It assumes that, while measures will be taken to reduce greenhouse gas emissions, extreme carbon taxes will be not be widespread by the turn of the century.

Oil Prices

Exhibit 1 shows the oil price scenario that is consistent with the supply and demand projections presented in this Outlook. Note that prices are adjusted for inflation and expressed in constant 1992 dollars. Oil prices remain in the $16 to $30/barrel range for several years as oil production keeps pace with modest oil demand growth. The top part of this range would be reached only during periods of supply disruption most likely caused by political events. Prices are expected to rise slightly to around $24/barrel in the second half of the decade, providing incentives for the additional capital investments needed to expand crude oil production capacity. Oil prices will remain volatile and trade in a range, as illustrated in Exhibit 1, as the market adjusts to changing supply and demand conditions and periodic political instability or the fear of such instability.

Natural Gas Prices

Natural gas prices are expected to remain competitive with other fossil fuels in most countries outside of North America. In some areas, changing regulations are forcing greater competition within their natural gas industries, but gas-on-gas competition will be limited to the United States and Canada.

Coal Prices

Coal prices are not expected to increase beyond the rate of inflation. Environmental opposition to coal use will limit the growth in demand, and coal supplies will remain abundant.

Non-Fossil Fuel Economics

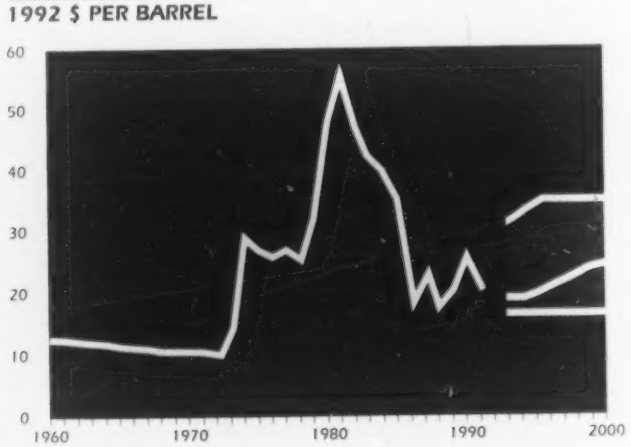
Non-fossil fuels include nuclear power generation, hydroelectric power and other renewable fuels. Expansion of nuclear power is hampered by the high capital costs of current technology, long lead times, public opposition and changing safety standards.

In developed nations, much of the hydroelectric potential has been exploited, and there is now strong environmental opposition to the development of new facilities. In developing nations, high capital costs and the lack of investment funds continue to restrain development of hydroelectric resources.

Given the base oil price assumption, other renewable energy (such as solar, wind and biomass) will likely remain uneconomic, and these alternative fuels are not expected to contribute greatly to energy supply through 2000. In the longer term, technological developments that lower costs could lead to greater use of these energy sources.

Note: Throughout this Outlook, the "World" includes both non-Communist, Communist and former Communist countries. For lack of a better acronym, the former and current Communist countries are still referred to as the "Centrally Planned Economies" (CPEs). "Developed Nations" refer to the member countries of the Organization for Economic Cooperation and Development (OECD). "Developing Nations" refer to the remaining countries.

CRUDE OIL PRICES — EXHIBIT 1



DEMAND - World energy demand has been growing 2.3% per year since the 1986 fall in oil prices. On average, growth in world energy demand is expected to slow to 1.7% per year during the 1990s. Energy demand was 163 million barrels of oil equivalent per day (MMboed) in 1990, and will rise to 192 MMboed by 2000.

Exhibit 2 shows a regional breakdown of energy use. Energy demand in developing nations, particularly in Asia, will grow the fastest, between 3 and 4% per year, as energy is used to fuel economic expansion and meet rising living standards. Energy demand growth will be slower in the United States and other developed nations. In the CPEs, there is a large potential for conservation and greater energy-use efficiencies, which will offset some of the growth in energy demand.

Exhibit 3 shows the amount of energy consumed per unit of economic output, by region. Overall world energy intensity is forecast to decline at a rate of 1% per year. Energy intensity in developing nations, which has been increasing, is expected to level off as energy demand grows at about the same rate as the economy. Developed nations will continue to achieve minor improvements in the efficiency of energy utilization.

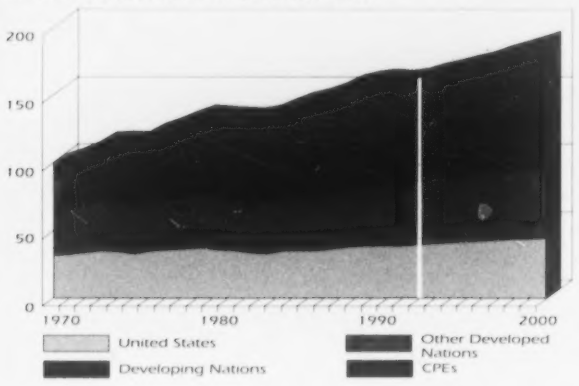
The energy-intensive CPEs use two times as much energy per unit of economic output as the United States and the developing nations, and three times as much as other developed nations. Initially, energy intensity will increase as economic output falls faster than energy consumption. Thereafter, concerns over pollution and environmental degradation will likely lead to fiscal incentives which, along with rising energy prices, will encourage greater conservation and improvements in efficiency of energy use.

SUPPLY - Oil and gas will supply over 70% of the growth in energy demand. Price competitiveness and the lack of economic, non-petroleum alternatives for transportation will make oil and gas the fuels of choice during this decade.

Exhibit 4 shows the growth in energy demand between 1973 and 1990 and the forecast through 2000, by fuel. Between 1973 and 1983, energy demand increased by 20 MMboed. Oil supplied only 1% of the growth in energy demand during this period due to high prices and substitution brought on by the commissioning of nuclear power plants. Since 1983, energy demand has risen 27 MMboed, and oil has captured over 25% of new energy markets. Oil and natural gas will supply most of the growth in energy demand through the end of the century.

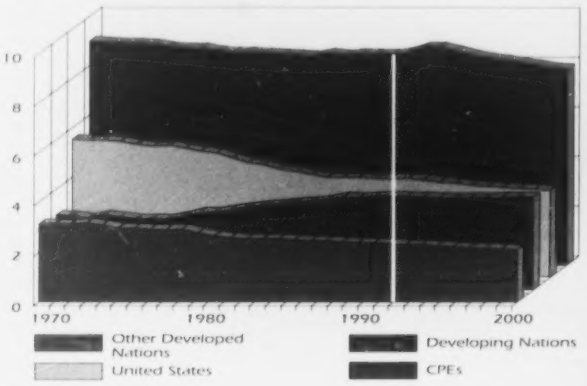
WORLD ENERGY DEMAND EXHIBIT 2

MILLION BARRELS PER DAY OIL EQUIVALENT



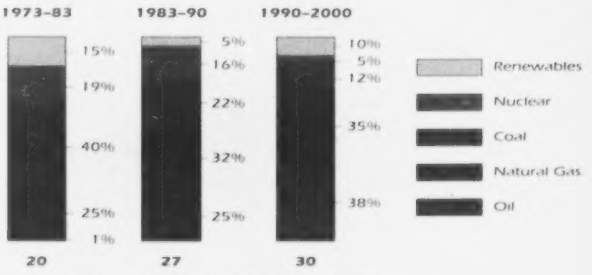
ENERGY INTENSITY EXHIBIT 3

BARRELS OIL EQUIVALENT PER $1000 GDP



INCREMENTAL WORLD ENERGY SUPPLY EXHIBIT 4

1973 - 2000



MILLION BARRELS PER DAY OIL EQUIVALENT

DEMAND - Oil demand has been growing more than 2% per year since the 1986 fall in oil prices, and currently supplies 40% of the world's energy needs. Oil demand growth is forecast to average 1.5% per year through the end of the decade. Most of the increase in oil consumption will be for transportation fuels. The highest rates of growth will continue to be in the developing nations, averaging over 3% per year.

World oil demand will rise from 68 million barrels per day (MMbd) in 1990 to around 80 MMbd by 2000, as shown in **Exhibit 5**. Although the developing nations currently consume only 23% of world oil demand, they will account for nearly half of the growth in oil use. About half of the increase in developing nations' oil consumption will be for transportation fuels and half for stationary applications.

Oil demand growth in the developed nations will be principally for transportation fuels. Oil demand in the CPEs will rise only modestly as greater end-consumer demand is offset by shifts in the economy toward less energy-intensive activity as well as more efficient industrial oil use.

In 1979, demand for oil products was 66 MMbd. By 1983, oil demand had fallen to 60 MMbd in response to the rise in oil prices. Residual fuel oil accounted for more than two-thirds of the loss in oil demand. **Exhibit 6** shows world oil demand by product. The world's appetite for light products continues to grow. Growing transportation needs are the impetus for increased light product demand.

Over the past two decades, worldwide gasoline demand growth has averaged 2% per year. Gasoline demand growth is expected to average 1.8% per year through the rest of the century. Increased miles driven, and greater car ownership, particularly in the developing nations and the CPEs, will offset increases in vehicle fuel efficiency.

Jet fuel and kerosene demand are expected to increase 1.9% per year. Aircraft fuel efficiency will continue to improve, keeping it cost-competitive with land and sea transport. However, increases in air travel are expected to more than offset any fuel efficiency gains.

About one-fourth of the world's oil demand is for distillate, and demand is expected to increase 2.1% per year. Most of the growth will come from increased distillate consumption for transportation.

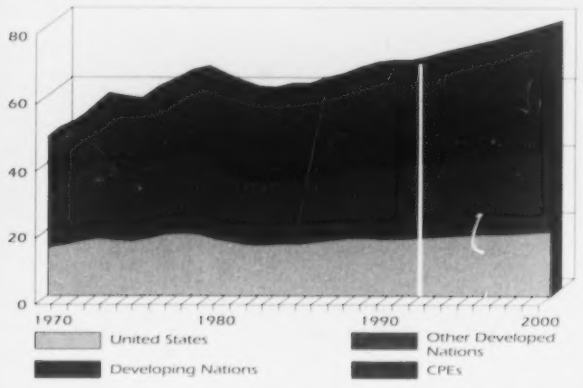
The high prices of the early 1980s made residual fuel oil uncompetitive. Most of the opportunities to substitute other fuels for residual fuel oil have been exhausted, except possibly in the CPEs. Since the fall in oil prices in 1986, residual fuel oil has once again become an economic fuel choice for utilities and industrial boilers. Hence, demand is expected to increase at 1% per year.

Much of the surplus in worldwide crude oil refining capacity has been absorbed by growing demand, and distillation capacity will need to be expanded to meet increased consumption. The growth in light product demand will require the construction of new heavy oil upgrading capacity. In addition, investments will be needed to meet more stringent product specifications, and refiners will have to make capital expenditures to reduce solid waste and emissions to air and water.

Increased environmental concerns are leading to more stringent regulations on fuel quality and emissions. While quality standards are tightest in the developed nations, environmental concerns are coming to the forefront in almost every country.

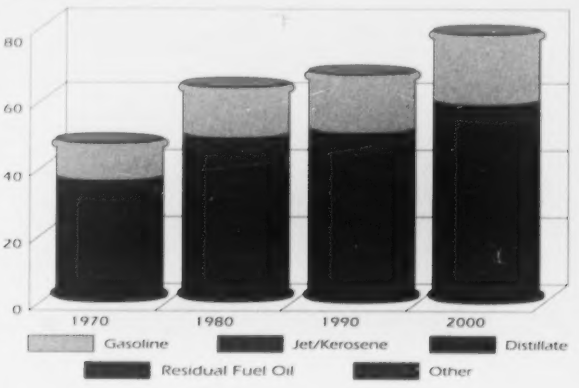
WORLD OIL DEMAND BY REGION EXHIBIT 5

MILLION BARRELS PER DAY



WORLD OIL DEMAND BY PRODUCT EXHIBIT 6

MILLION BARRELS PER DAY



The switch to unleaded fuel is almost complete in the United States, moving ahead in Europe, and under way in many of the developing countries. In addition, some of the new U.S. gasoline standards, as detailed in the 1990 Reauthorization of the U.S. Clean Air Act, are likely to be adopted by other countries. These tighter standards include lower volatility, increased oxygenates and lower aromatics.

The world also continues to move toward lower sulfur content products. Many countries have tightened their restrictions on fuel oil sulfur content, and stricter sulfur specifications for diesel fuel are on the horizon in both developed and developing nations.

SUPPLY - Low oil prices have led to a return of strong oil demand growth, and OPEC has been able to regain some of its lost market share. Moreover, low prices have slowed the growth in non-OPEC oil supplies. Exhibit 7 shows world crude oil production by region.

Following the 1986 fall in crude oil prices, total non-OPEC production stabilized at around 37-38 MMbd. As **Exhibit 7** shows, other non-OPEC production rose as several smaller producers dramatically increased production, including Colombia, Syria, and Yemen. In addition, North Sea capacity continued to rise, despite setbacks and declines in some mature fields. The gains of other non-OPEC producers, however, were not sufficient to offset the 1.4 MMbd decline in U.S. output and the more recent decline in the former Soviet Union.

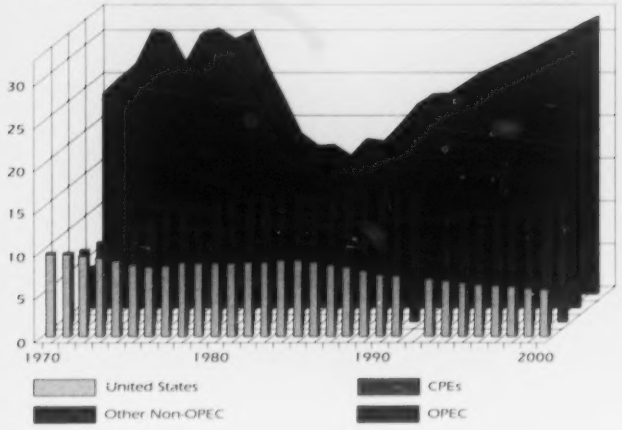
Total non-OPEC supplies are expected to remain relatively unchanged throughout the decade. Higher production in the North Sea and Mexico and from new field additions by smaller producers will offset continued declines in the United States. Production from the former Soviet Union remains a wild card, but production is likely to fall further before it recovers.

The rapid growth in oil demand has led to the shrinking of OPEC's excess capacity. This tightness in supply was most evident during the Persian Gulf crisis in which Iraqi and Kuwaiti capacity was taken out of the market. Unlike previous supply disruptions, OPEC chose to moderate prices rather than capitalize upon them. Saudi Arabia increased its production fairly easily through debottlenecking and bringing back fields which were shut in during the 1980s.

Production capacity should be adequate for a few years once sanctions are lifted on Iraqi exports and Kuwaiti crude production recovers. However, these supply additions will not be sufficient to meet demand for OPEC oil which is expected to reach 33MMbd by 2000, and investment in new capacity will be required. Almost all of the incremental OPEC production will come from the Middle East, where most of the world's reserves are found, as illustrated in **Exhibit 8**. In any case, crude production capacity additions will not directly match the growth in oil demand, and there are likely to be periods of undersupply and oversupply, adding to price volatility.

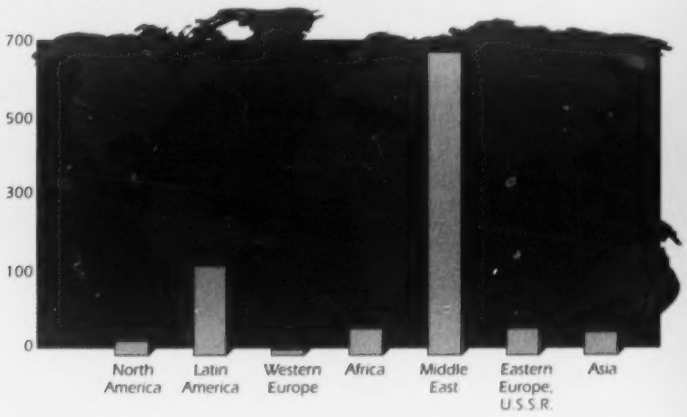
WORLD OIL SUPPLY EXHIBIT 7

MILLION BARRELS PER DAY



WORLD OIL RESERVES EXHIBIT 8

BILLION BARRELS



WORLD NATURAL GAS DEMAND & SUPPLY

Natural gas, once considered an unwanted by-product of oil production, now provides one-fifth of the world's energy needs. Lower natural gas prices have led to a 20% increase in demand over the last five years. Worldwide natural gas demand is expected to grow at the rate of 3% per year for the rest of the decade. Continued cost-competitiveness and lower air pollutant emissions relative to other fossil fuels will contribute to the increase in natural gas consumption.

Exhibit 9 shows natural gas demand by region. Most natural gas is consumed in Europe, the former Soviet Union, and in North America, where there are significant gas reserves and gas production. Most of the growth in natural gas demand will come from these regions, as well as East and Southeast Asia. Liquified natural gas will play a role in the fuel diversification strategies of many Asian countries.

OTHER FUELS

Coal currently meets more than one-fourth of the world's energy needs, and coal demand is expected to grow 1% per year, about one-half the rate of the 1980s. Coal prices will remain low, but costs associated with meeting environmental measures will increase, limiting the construction of new conventional coal-fired facilities. However, commercialization of advanced clean-coal technology is likely to lead to more robust growth in the early part of the next century.

Nuclear power generation increased three-fold between 1980 and 1990 as a number of plants were commissioned. Concerns over safety and waste disposal, as well as high capital costs and regulatory barriers, have led to a slow-down in nuclear power expansion. Consequently, nuclear power generation is expected to increase by only 1 to 2% per year over the next decade.

Some nuclear power plants, already under construction, will be commissioned during the decade, but new plant construction is limited to a few countries. Increases in nuclear power generation will also occur through greater efficiency and reduced down-time. These increases will be offset by plant retirements as some units reach the end of their operating lives and as some are shut down for safety purposes.

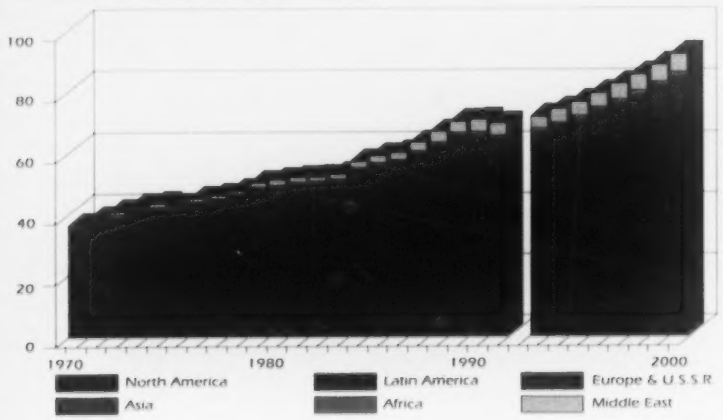
Environmental concerns over global climate change, along with new technology and evidence of safe, viable operation, may lead to plans for construction of new nuclear power plants in some countries after the year 2000.

Hydroelectric power generation and other forms of renewable power are expected to increase at a rate of more than 2% per year. There is growing environmental opposition to siting of new hydroelectric power plants. However, some new installations are likely at suitable locations in countries with sufficient capital. Hydroelectric power output will also rebound in areas which have experienced drought over the last several years. Renewable energy sources such as solar, photovoltaic, wind and biomass, will continue to play a limited role in the world's energy supply until they become cost-competitive with fossil fuels.

WORLD NATURAL GAS DEMAND

EXHIBIT 9

TRILLION CUBIC FEET PER YEAR



U.S. ENERGY DEMAND & SUPPLY

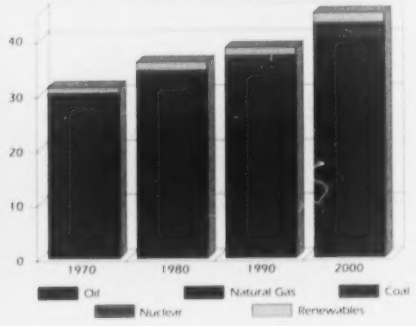
U.S. energy demand is expected to increase about 1.5% per year through 2000.

Greater use of electricity, particularly in the commercial and residential markets, will account for most of the growth in energy demand. Exhibit 10 shows the forecast for U.S. energy supply by fuel. More than three-fourths of incremental demand will be for oil and gas. Natural gas demand will increase more rapidly than demand for any other energy source, primarily due to its increased use in electricity generation.

U.S. ENERGY SUPPLY

EXHIBIT 10

MILLION BARRELS PER DAY OIL EQUIVALENT



U.S. ELECTRICITY DEMAND & SUPPLY

U.S. electricity demand is closely related to general economic conditions, and electricity demand is forecast to grow less than 3% per year, somewhat less than growth in Gross Domestic Product. While implementation of demand-side management programs will dampen growth in electricity demand, growth will not be eliminated.

As Exhibit 11 shows, coal is the primary fuel used in electric power generation and demand is expected to increase more than 1% per year. Under our base fuel price assumptions, coal will have competition from natural gas for new base-load power generation, where natural gas supplies are available. In order to meet the sulfur dioxide emissions limits set out in the 1990 Reauthorization of the Clean Air Act, increased coal use will necessitate lower sulfur content in coal burned and more scrubbing installations at existing power stations. Although coal will provide a smaller share of electricity supplies by the end of the decade, coal-fired plants will still generate more than one-half of U.S. electricity. Nuclear power use will increase only modestly during the 1990s, at less than 1% per year. Only one new unit is expected to start up during the decade.

Increases in output from hydroelectric power plants and from other renewable sources will be limited to 2% per year. A small number of new additions are projected to come on-stream in the early 1990s. Furthermore, full recovery at existing hydroelectric units that have been affected by drought conditions is assumed.

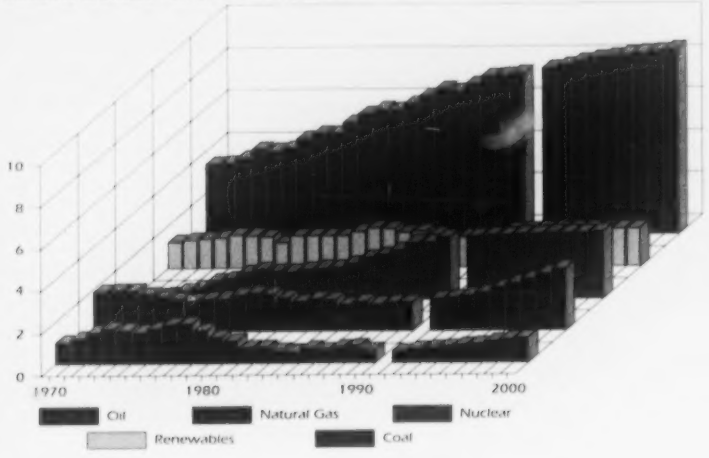
Electric utility demand for natural gas will more than double from its 1990 level of 2.8 trillion cubic feet (TCF), to 6.0 TCF by 2000. Because of their higher fuel efficiency, lower fixed operating costs, shorter lead time and construction periods, and ease of permitting, natural gas-fired combined cycle units and combustion turbines are likely to be the preferred technology for much of the new generating capacity additions in the United States.

During the early part of the 1980s, oil used for power generation declined markedly, as nuclear and coal-fired plants came onstream. Additionally, electricity demand growth failed to meet expectations, which led to excess generating capacity. Today, most nuclear and coal-fired units are fully utilized, but there is still excess oil-fired capacity. Oil used for power generation is expected to double from current levels to more than 1 MMbd by 2000.

U.S. ELECTRICITY SUPPLY

EXHIBIT 11

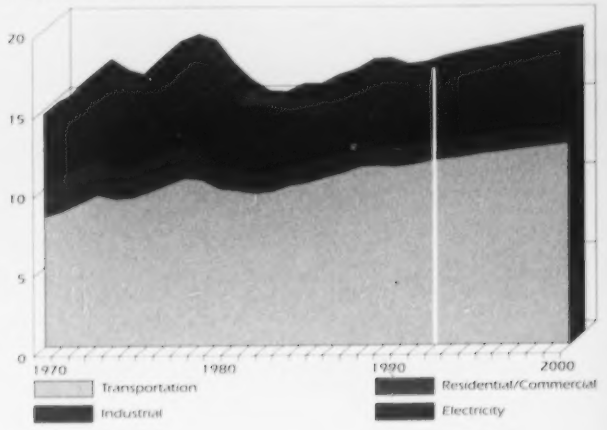
MILLION BARRELS PER DAY OIL EQUIVALENT



U.S. OIL DEMAND BY SECTOR

EXHIBIT 12

MILLION BARRELS PER DAY



U.S. OIL DEMAND & SUPPLY

DEMAND - U.S. oil demand is projected to grow 1.5% per year, with over half of the growth coming from greater use of oil for transportation. Demand growth is expected for both heavy and light products. Stricter product quality standards will affect the entire product slate.

U.S. oil demand is expected to rise from 17.0 MMbd in 1990 to about 19.3 MMbd by 2000. As Exhibit 12 illustrates, two-thirds of total U.S. oil demand is used for transportation. So, although transportation demand for oil will grow only 1% per year, it will account for 60% of incremental oil demand.

Oil is once again a cost-competitive fuel, and oil used by industry and in power plants is expected to increase. Oil use in residential and commercial applications will be relatively unchanged over the decade as little incentive remains for fuel-switching under our base oil price assumption.

Oil demand by product is shown in Exhibit 13. Gasoline accounts for more than 40% of U.S. oil demand. Gasoline demand is expected to grow slowly, at less than 1% per year. Compliance with gasoline product standards as specified by the 1990 Reauthorization of the Clean Air Act will likely lead to higher consumer prices, thereby depressing demand. In addition, some gasoline volume will be lost to alternative fuels, such as propane and compressed natural gas. Although alternative fuels will make a contribution in some markets, gasoline will remain the dominant transportation fuel.

Jet fuel and kerosene demand will grow 1.6% per year during the 1990s. Increases in both passenger air travel and air freight traffic are expected to offset improvements in aircraft fuel efficiency.

Distillate demand is expected to grow 2% per year. Two-thirds of the growth will come from greater use of diesel fuel for road transport. Use of distillate as a peak-load fuel in power generation is also expected to increase.

Demand for residual fuel oil is expected to increase 2.7% per year; nonetheless, demand in 2000 will be only half of what it was in the late 1970s. Residual fuel oil consumption in power plants will rise as utilities increasingly rely upon their underutilized oil-fired capacity to supply electric power demand. Residual fuel oil use by marine bunkers will also increase, reflecting the growing need for oil imports.

SUPPLY - U.S. crude oil production has been declining at the rate of more than 4% per year for the last 5 years, but the rate of decline in U.S. production is expected to slow to less than 3% per year due to better management and recovery of known reserves. Crude oil production is expected to fall to 5.6 MMbd by 2000.

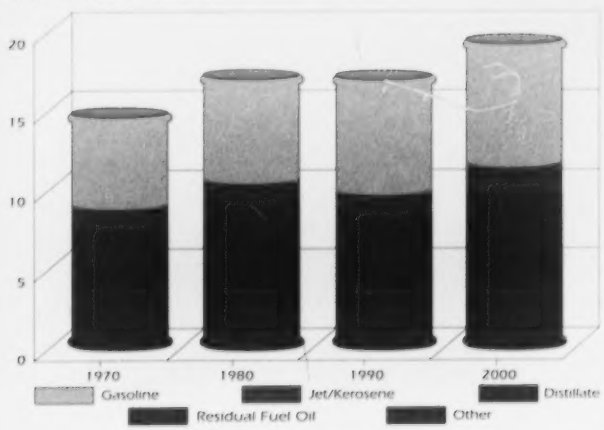
The petroleum potential of the United States has been intensively explored, and the only areas where significant new reserves or production may be developed are areas where new technology, such as deep water or arctic production systems, is needed to provide access, or where lands previously withheld from development are opened. Aside from such new reserve opportunities, U.S. production is in decline.

The natural decline of U.S. fields has been moderated by a number of methods, such as better maintenance, improved lift systems, secondary recovery, infill drilling and horizontal drilling in marginal areas. Although these measures can slow the rate of production decline for producing fields, they will be insufficient to replace reserves already produced.

Without major new field additions, the United States will need to import more than 11 MMbd by the end of the decade in order to meet projected demand, compared to 6 MMbd today, as illustrated in Exhibit 14.

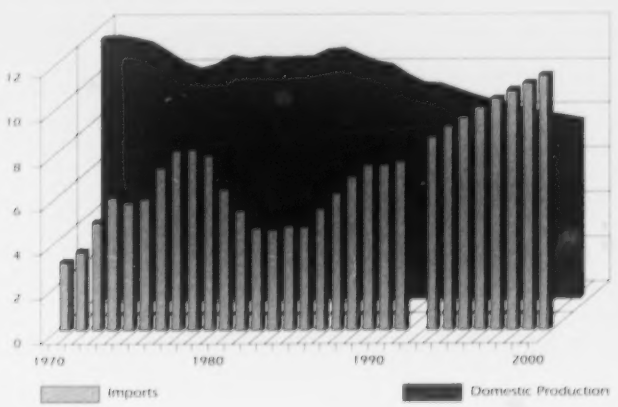
U.S. OIL DEMAND BY PRODUCT EXHIBIT 13

MILLION BARRELS PER DAY



SOURCE OF U.S. OIL SUPPLY EXHIBIT 14

MILLION BARRELS PER DAY



U.S. NATURAL GAS DEMAND & SUPPLY

Natural gas demand in the United States is expected to increase from 18.8 TCF in 1990 to about 23.4 TCF by 2000. Most of the growth in demand will come from greater use of gas in electricity generation, including use by non-utility generators. While imports of natural gas are expected to increase, domestic production will continue to supply more than 90% of U.S. natural gas demand.

Natural gas is expected to play an increasingly important role in the U.S. energy supply picture. Exhibit 15 shows natural gas demand by sector. Gas-fired electric power generation will account for more than two-thirds of the growth in natural gas demand. The economics and environmental benefits of natural gas-fired power stations and cogenerating units will continue to compare favorably with new coal, nuclear and oil-fired units.

Currently, industrial, residential and commercial markets are the main natural gas consumers. The industrial market is fairly mature, so industrial gas demand is expected to have low growth, as increased use-efficiency offsets growth from new customer demand. Residential and commercial demand is expected to rise moderately over the decade as expansion of natural gas pipelines increases gas availability.

U.S. natural gas supplies are depicted in Exhibit 16. Imports, mostly from Canada, are expected to rise from 1.5 TCF in 1990 to 2.6 TCF in 2000. U.S. natural gas prices are forecast to rise, but not to a level that would justify significant imports of liquified natural gas or development of Arctic supplies. Hence, most of U.S. natural gas demand is expected to be supplied from domestic production. Given the current reserve base, this will require exploration and development of new reserves as well as development of existing fields.

POLICY IMPLICATIONS

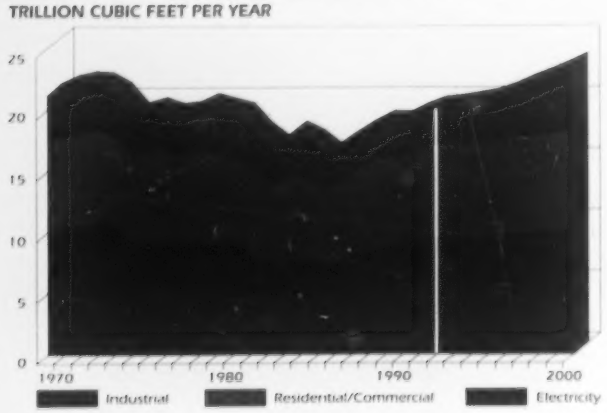
While the world is faced with a number of challenges, two important goals for the United States, as well as other nations, are to achieve environmental aims and sustained economic growth. The conclusion of this Outlook, that world energy demand, particularly that for fossil fuels, will increase through the turn on the century, has important implications for meeting these goals.

Low-cost fossil fuels help in realizing economic growth, and, with the prospect of greater reliance on them, there is an even greater need to find ways of using them in an environmentally acceptable manner. However, the development and implementation of environmental technologies are likely to entail higher costs to the consumer.

Ironically, at the same time that low-cost fuels help economic expansion, greater reliance on them places economies at greater risk to energy price shocks, particularly oil price shocks. As this Outlook suggests, almost all of the growth in oil demand will be met by supplies from the Middle East, an area which remains volatile. It is unlikely that the United States will be able to reduce its dependence on imported energy supplies, let alone eliminate it. Therefore, it is imperative to manage that dependence.

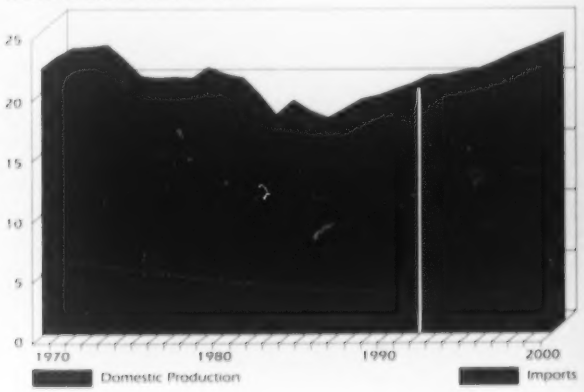
U.S. NATURAL GAS DEMAND BY SECTOR EXHIBIT 15

TRILLION CUBIC FEET PER YEAR



U.S. NATURAL GAS SUPPLY EXHIBIT 16

TRILLION CUBIC FEET PER YEAR



The challenge for policymakers is to find solutions to environmental problems that are compatible with economic growth. A strategy for achieving both environmental and economic goals is to encourage conservation and fuel diversification.

Encourage stronger energy conservation measures

There are two parts to conservation. One is to simply reduce energy consumption by using less, such as lowering the thermostat. The second is to use energy more efficiently. Although both methods lead to a reduction in harmful emissions, the first is difficult to impose and the savings are often fleeting. Investments in the second, however, enhance competitiveness and productivity, thereby providing long-term economic benefits.

Policymakers can encourage energy conservation by educating consumers and encouraging them to take advantage of more efficient equipment and appliances, and by accelerating research and development of more efficient engines, furnaces and other technologies.

Two-thirds of all U.S. oil demand is used for transportation, primarily in automobiles. Thus, it is particularly important for policymakers to adopt effective and cost-efficient measures that would promote energy conservation in the transportation sector. Since price is the best incentive for conservation, one step that would lead to lower oil dependence and improved air quality is raising gasoline taxes. A half-dollar per gallon increase would both reduce demand and encourage the purchase of more efficient automobiles.

Encourage fuel diversification by promoting a cleaner-burning fuel slate

A diversification strategy should promote research and development of long-range, alternative energy producing technologies, and further the use of existing cleaner-burning fuels.

The use of propane, compressed natural gas, and other fuels should be encouraged where it makes economic sense, particularly in fleet vehicles. While use of alternative fuels will increase, widespread substitution of gasoline and diesel fuel is not currently feasible or practical.

In the United States, the 1990 Reauthorization of the Clean Air Act will go a long way toward promoting reliance on cleaner-burning fuels, particularly cleaner- burning, reformulated motor gasolines. Policymakers should ensure that refiners and marketers have the flexibility they need to achieve the clean fuel goals of the Clean Air Act and respond to consumer pressures for cleaner-burning, cost-effective fuels. This means prescribing goals consistent with available technology and not mandating the means by which they are achieved.

In the United States, deregulation of the natural gas market has allowed natural gas to assume a more important role as an energy source. It is sound energy and environmental policy to encourage the maximum use of natural gas in our fuel mix.

In addition to supporting conservation and fuel diversification, policymakers should encourage the diversification of crude oil sources as a means of reducing dependence on oil from the Middle East.

Encourage broader international oil and gas investment

To encourage international investment in the near-term, the U.S. government should provide greater flexibility to U.S. energy companies in crediting foreign taxes against their U.S. tax liability. To encourage investment over the long-term, the U.S. government should launch an effort to expand tax and other incentive options that would encourage U.S. investment in the international arena.

Recent geo-political events have worked to enhance investment and technology transfer opportunities in the energy sectors of the Soviet Union, Eastern Europe, and elsewhere around the world. With the right mix of incentives, this investment, and the corresponding development of energy resources worldwide, could continue at an accelerated pace.

Encourage diversification of crude oil supply sources through access to promising acreage

The coastal plain of the Arctic National Wildlife Refuge and offshore areas in California and other states are prime examples of acreage that should be made available for leasing, exploration and development under conditions providing full protection for the sensitive ecology of these regions. Successful development of these areas would help offset declines in existing domestic production and contribute substantially to the ability of the United States to manage its growing import dependence.

Prepared by:
Planning and
Analysis Department

For additional copies,
write to:
Public Relations Department
Conoco Inc.
P.O. Box 2197
Houston, Texas 77252

DUPONT